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A new species of Polycirridae (Annelida: Terebellida) and three new reports for Cantabrian and Mediterranean Seas

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Abstract: Several polychaetes species from the central Cantabrian (NE Atlantic Ocean) and western Mediterranean Seas were studied. The Fabriciidae species *Parafabricia mazzellae* and *Pseudofabricia aberrans* are recorded for the first time in the western Mediterranean Sea and *Novafabricia infratorquata* in the northeast Atlantic Ocean (Cantabrian Sea). A new species of Polycirridae, *Polycirrus asturiensis* sp. nov., is described for the Cantabrian Sea; it is characterized by having two types of buccal tentacles, a transverse prostomium covering segment 1, a trilobed upper lip, notopodial lobes equally long, notochaetigerous segments with broadly winged chaetae of different lengths and widths, up to segment 12, and type-1 neurochaetae beginning on segment 6. New habitat information for the fabricids *Novafabricia infratorquata, Parafabricia mazzellae* and *Pseudofabricia aberrans* is also provided.

Résumé : *Une nouvelle espèce de Polycirridae (Annelida : Terebellida) et trois nouveaux signalements en Mer Cantabrique et en Méditerranée.* Plusieurs espèces de polychètes appartenant aux familles Fabriciidae et Polycirridae ont été étudiées en Mer Cantabrique et en Méditerranée occidentale. Les espèces de la famille Fabriciidae, *Parafabricia mazzellae* et *Pseudofabricia aberrans,* sont signalées pour la première fois en Mer Méditerranée occidentale, ainsi que *Novafabricia infratorquata* en Mer Cantabrique, au nord-est de l'Océan Atlantique. Une nouvelle espèce de polycirridé, *Polycirrus asturiensis* sp. nov., est décrite en Mer Cantabrique. La nouvelle espèce est caractérisée par deux types de tentacules oraux, un prostomium transversal couvrant le premier segment du corps, une lèvre supérieure trilobée, les lobes du notopode de la même longueur, les segments avec notopodes portent des soies ailées de différentes longueurs et largeurs jusqu'au segment 12, et les neuropodes sont présents au segment 6 et portent des soies de type 1. De nouvelles informations sur l'habitat des espèces *Novafabricia infratorquata, Parafabricia mazellae* et *Pseudofabricia aberrans* sont fournies.

Keywords: Fabriciidae ● New records ● Taxonomy ● *Polycirrus asturiensis* sp. nov. ● Atlantic Ocean ● Polychaeta

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Introduction

The polychaete families Polycirridae Malmgren, 1866 and Fabriciidae Rioja, 1923 are poorly studied for the Mediterranean and Cantabrian Seas. Although a complete revision of known species in these areas is lacking, there are several reports of polycirrids (e.g. Ariño, 1987; Simboura, 2011). In contrast, only a few species of fabriciids have been reported, requiring specialists to clarify taxonomic characters used for species identification (Giangrande et al., 2014).

Polycirrids were originally described as a subfamily of Terebellidae Malmgren, 1866. Recently, Nogueira et al. (2013) raised it to the family level based on morphological evidence. Polycirrids are defined by the absence of branchiae, the presence of a circular upper lip, at least two types of buccal tentacles, and a second segment distinctly narrower than the following segments (Fitzhugh et al., 2015).

Fabriciids were described as a subfamily of Sabellidae Latreille, 1825 until Kupriyanova & Rouse (2008) considered it as an independent family based on molecular studies. More recently, Huang et al. (2011) used morphological and molecular data confirming its family status. Fabriciids are characterized by the absence of ventral lips, modified abdominal uncini with an elongate manubrium, the presence of branchial hearts and male reproductive features only found within this group, after Rouse (1995a & b) and by Huang et al. (2011): (1) Spermiogenesis only in the thorax, in large clusters with a central cytophore, (2) Single dorsal sperm duct, (3) Sperm nuclear projection, (4) Thickening of the sperm nuclear membrane and (5) Sperm extra-axonemal sheath.

Several samples of benthic polychaetes from the western Mediterranean and central Cantabrian Seas were studied. The species *Pseudofabricia aberrans* Cantone, 1972 and *Parafabricia mazzellae* Giangrande, Gambi, Micheli & Kroeker, 2014 are reported for the first time in the westernmost Mediterranean Sea. For the Cantabrian Sea, *Novafabricia infratorquata* (Fitzhugh, 1983) is reported for the first time and a new species of Polycirridae, *Polycirrus asturiensis* sp. nov., is described.

Material and Methods

The specimens studied here were collected from seven localities from three independent studies (Fig. 1 and table 1). Samples from the Cantabrian Sea were collected at Las Llanas Beach during July 2013 from intertidal rocky shores at low tide. Specimens were removed from algal tufts, fixed in 100% ethanol then preserved in to 70% ethanol. Specimens from Cape Palos (Mediterranean Sea) were collected by snorkelling in June 2013 from rhizomes of *Posidonia oceanica* (Linnaeus) Delile, 1813. Samples were removed from rhizomes, fixed in 100% ethanol and then preserved in 70% ethanol. The other Mediterranean Sea (Balearic Archipelago, Columbretes Islands and Alborán Island) samples were collected within the framework of the "Fauna Ibérica" national project during the summers of 1994 and 1996. Samples were collected by scuba diving or using a beam trawl, fixed in 5% neutralized formalin or 70% ethanol and preserved in 70% ethanol (Templado et al., 1993).

Examination of specimens was made using a Leica MZ16A stereomicroscope and a Carl Zeiss 66649 compound light microscope. Photographs were taken on the above mentioned optics with a Leica DFC550 and a Nikon DSFi1 camera respectively, and a FEI INSPECT scanning electron microscope (SEM) in the Electron and Confocal Microscopy Laboratory of the National Museum of Natural Sciences (MNCN) of Madrid. For SEM, specimens were briefly dehydrated through an ethanol series, then a hexamethyldisilazane (HMDS)-ethanol series and finally into HMDS for critical point drying (Nogueira et al., 2010). Specimens were air dried then coated with gold.

Illustrations were made with a camera lucida attached to a Carl Zeiss SV8 stereomicroscope and edited using Adobe Photoshop 6.0 and Adobe Illustrator CC 2014. All material is deposited in the Invertebrates collection of the MNCN. The number of collected specimens per species is indicated in brackets after the code of MNCN Invertebrates Collection in Results section.

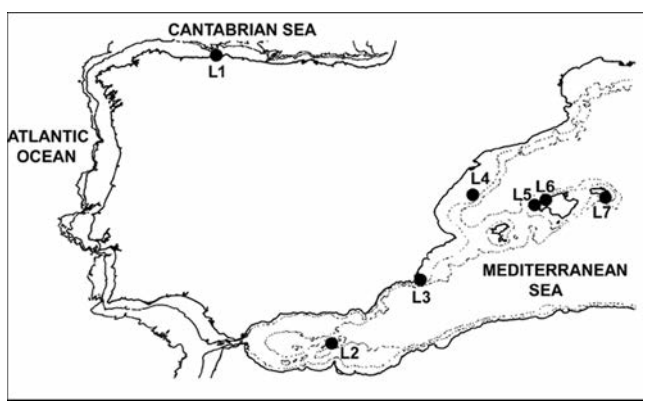

Figure 1. Sampling localities along Cantabrian and Mediterranean Seas. See Table 1 for code localities.

Table 1. Sampling localities. Expedition, code of locality, locality, geographical coordinates, nature of substratum of sampling stations and depth. Codes of localities were ordered from the Cantabrian Sea to the eastern end of the Mediterranean Sea.

Expedition	Code	Sea	Locality	Latitude	Longitude	Habitat	Depth (m)
Occasional sampling in Asturias	L1	Cantabrian Sea	Beach Las Llanas (Asturias)	43º33'39.90''N	6º06'15.19''W	Macroalgae assemblages of *Stypocaulon scoparium, Corallina elongata* and *Lithophyllum incrustans*	4-6
FAUNA IV	L2	Mediterranean Sea	Alborán Island	35º55'40.80''N	3º03'15.00''W	Calcareous rhodolites	33-49
Occasional sampling in Murcia	L3	Mediterranean Sea	Cape Palos (Murcia)	37°37′49.64″N	00°42′05.19″W	Rhizomes of *Posidonia oceanica*	4
FAUNA III	L4	Mediterranean Sea	North of Columbrete Grande (Columbretes Islands)	39º54'01.20''N	0º41'09.00''E	Rocky coraligenous and coastal detritus	47
FAUNA III	L5	Mediterranean Sea	Cape Punta Jova (Majorca Island)	39º38'30.00''N	2º25'07.80''E	Photophilic macroalgae assemblages	10
FAUNA III	L6	Mediterranean Sea	Cape Punta de La Foradada (Majorca Island)	39º45'33.00''N	2º37'13.80''E	Detritus and *Posidonia oceanica*	22
FAUNA III	L7	Mediterranean Sea	Cape Font (Minorca Island)	39º49'24.00''N	4º12'15.00''E	Unknown	18

Results and Discussion

Order Sabellida Levinsen, 1883
Family Fabriciidae Rioja, 1923
Genus *Novafabricia* Fitzhugh, 1990
Novafabricia infratorquata (Fitzhugh, 1983)
(Figs 2 & 3)

Fabricia infratorquata Fitzhugh, 1983: 284-289, Fig. 3D-J, 4.

Novafabricia infratorquata: Fitzhugh, 1990: 13, Fig. 8; Camp et al., 1998: 95; Bick, 2005: 142-147, Figs. 5-6; Tovar-Hernández & Salazar-Vallejo, 2006: 63; Zenetos et al., 2010: 395; Giangrande et al., 2014: 1423, Fig. 4L.

Novafabricia sp. cf. *N. infratorquata*: Licciano & Giangrande, 2006: 676-677, Fig. 4.

Examined material

Cantabrian Sea. L1: MNCN 16.01/16116 (2); MNCN 16.01/16129 (4); MNCN 16.01/16148 (2). Western Mediterranean Sea. L2: MNCN 16.01/16912 (1); L5: MNCN 16.01/16911 (9); L7: MNCN 16.01/16910 (1).

Description of examined material

Complete body with 8 thoracic and 3 abdominal chaetigers (Figs 2A & 3A-C), 1.0-1.6 mm length and 0.25-0.40 mm width. Body slightly flattened dorso-ventrally. Peristomium and thorax of constant width, wider than abdomen (Figs 2A & 3A-C). Pigmentation present in anterior body of specimens from Cantabrian Sea (Figs 2A-C & 3A-B, D-E).

Crown with two branchial lobes with semi-circular bases, 0.20-0.70 mm length. Branchial lobes composed of three radioles holding 5-6 pairs of pinnules (Fig. 2A). Pinnules terminating at the tip of radioles (Fig. 2D). Branchial hearts present (Fig. 2B). Dorsal lips low and fused to proximal-most pinnule, difficult to distinguish (Fig. 2C). Ventral filament appendages absent.

Anterior margin of anterior peristomial ring as low ridge dorsally and laterally (Figs 2B-C & 3A, D). Anterior margin of anterior peristomial ring as a triangular and thin lobe ventrally, distally pointed (Figs 2A & 3B-C, E). Anterior peristomial ring dorsally longer (Figs 2C & 3D) but as long as posterior peristomial ring, which maintains constant width (Figs 2A-C & 3D-E). Peristomial eyes present, round, black (Fig. 2B).

Peristomial rings divided by faecal groove mid-dorsally (Figs 2C & 3D). Faecal groove occupying up to one third of the collar segment width (Figs 2C & 3D). Faecal groove remarkably deep (Figs 2C & 3A, D). First chaetiger as long as both peristomial rings together, but slightly shorter than second chaetiger (Figs 2A-C & 3A-E). Thoracic chaetigers increasing in length towards the posterior end (Figs 2A & 3A-C).

Superior thoracic notochaetae narrowly hooded,

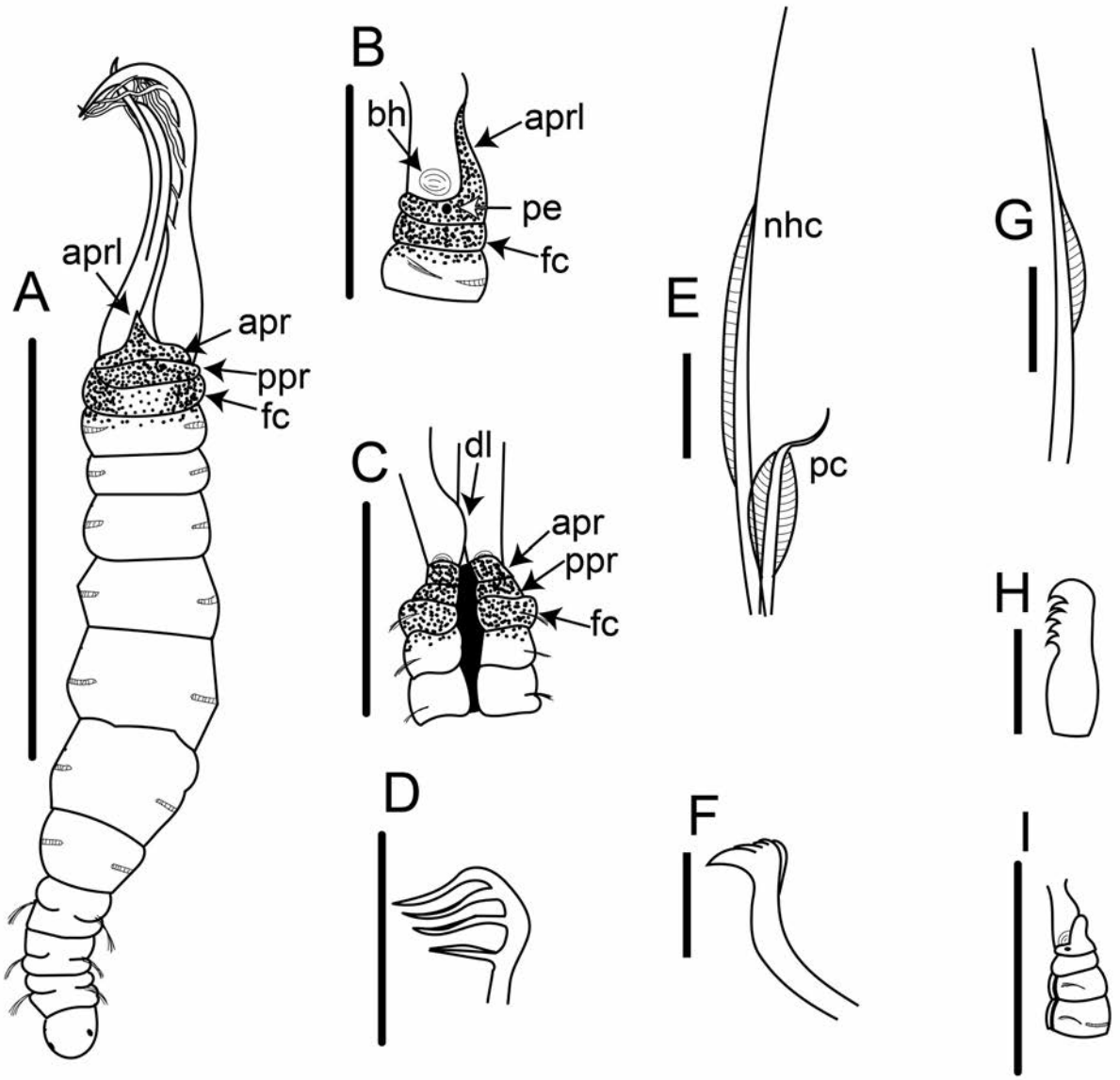

Figure 2. *Novafabricia infratorquata*. **A.** Complete specimen, ventral view. **B.** Anterior body, lateral view. **C.** Anterior body, dorsal view. **D.** Radiolar tip and last pairs of pinnules. **E.** Thoracic notochaetae. **F.** Thoracic uncinus. **G.** Abdominal neurochaeta. **H.** Abdominal uncinus. **I.** Anterior body, lateral view. apr: anterior peristomial ring; aprl: anterior peristomial ring lobe; bh: branchial heart; dl: dorsal lip; fc: first chaetiger; nhc: narrowly hooded chaetae; pc: pseudospatulate chaetaepe: peristomial eye; ppr: posterior peristomial ring. Scales: A 1 mm, B-D and I 0.5 mm, E-H 20 µm. A-H: MNCN 16.01/16148 (Cantabrian Sea); I: MNCN 16.01/16912 (Mediterranean Sea).

elongated (Figs 2E & 3F), 3-4 per fascicle. Inferior thoracic notochaetae of chaetigers 2 and 6-8 narrowly hooded, three times shorter than superior ones, 1 per fascicle. Inferior thoracic notochaetae of chaetigers 3-5 pseudospatulate (Figs 2E & 3G), 1-2 per fascicle. Thoracic uncini acicular, hooded, with main fang surmounted by unequal-sized secondary teeth, one of them longer and thicker in asymmetrical position (Figs 2F & 3H), 5-11 per fascicle in single or irregular double rows. Abdominal neurochaetae narrowly hooded, very enlongated (Fig. 2G), 2-4 per fascicle. Abdominal uncini with few large teeth in dentate region, approximately 5-6 rows in profile, with manubrium up to twice as long as dentate region (Figs 2H & 3I), 5-15 per fascicle.

Pygidium longer than previous chaetigers, very flattened, softly rounded (Figs 2A & 3A-C). A pair of

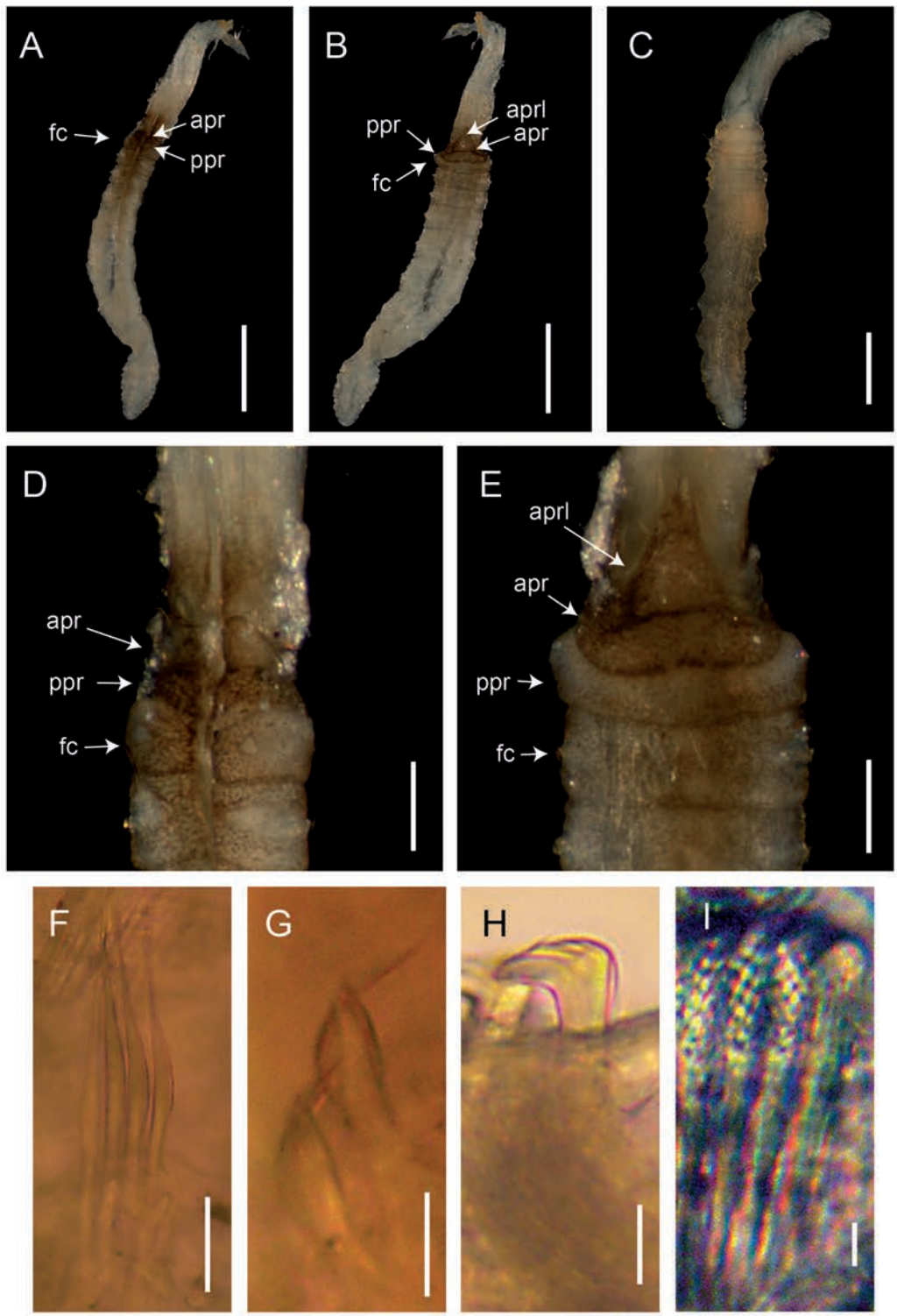

Figure 3. *Novafabricia infratorquata*. **A.** Complete specimen, dorsal view. **B.** Complete specimen, ventral view. **C.** Complete specimen, ventral view. **D.** Anterior body, dorsal view. **E.** Anterior body, ventral view. **F.** Thoracic narrowly hooded notochaeta. **G.** Thoracic pseudospatulate notochaeta. **H.** Thoracic uncini. **I.** Abdominal uncini. apr: anterior peristomial ring; aprl: anterior peristomial ring lobe; fc: first chaetiger; ppr: posterior peristomial ring. Scales: A-B: 500 µm, C-E: 200 µm, F-I: 10 µm. A-B and D-I: MNCN 16.01/16148 (Cantabrian Sea); C: MNCN 16.01/16912 (Mediterranean Sea).

pygidial eyes present, spherical and black (Fig. 2A). Tube not observed.

Remarks

Novafabricia infratorquata displays great variability in body pigmentation and the shape of the ventral lobe, as previously noted by Bick (2005) and Licciano & Giangrande (2006). Specimens from the Caribbean Sea and the western part of the Mediterranean (Balearic Islands and north-eastern coast of Spain) possess body wall pigmentation, while those from the type locality (Belize) do not (Bick, 2005). Specimens from other Mediterranean localities (Tyrrhenian and Adriatic Seas) also lack pigmentation (Licciano & Giangrande, 2006; Giangrande et al., 2014). In the material studied here, body wall pigmentation is absent in specimens from Alborán Sea and Balearic Islands (Figs 2I & 3C), while pigmented in the anterior end of Cantabrian Sea specimens (Figs 2A-C & 3A-B, D-E).

Furthermore, the ventral lobe was originally described as triangular and distally rounded (Fitzhugh, 1983). However, the ventral lobes of specimens from western Mediterranean were described as tongue-shaped, thicker, and protruding (see Figs 5A & 6A in Bick, 2005 and Fig. 4A-B in Licciano & Giangrande, 2006). The specimens analysed for this study also show this variation: Cantabrian Sea specimens have triangular, thin and distally rounded ventral lobes (Figs 2A-B & 3B, E), while western Mediterranean specimens have tongue-shaped, thicker and protruding ventral lobes (Figs 2I & 3C).

Distribution

Caribbean Sea (Belize, Cayman Islands, Twin Cays, Quintana Roo). North-western Atlantic Ocean (Florida). Cantabrian Sea (Asturias). Western Mediterranean Sea (Balearic Islands, north-eastern coast of Spain, Tyrrhenian Sea). Eastern Mediterranean Sea (south Adriatic Sea). It is considered as an alien species in the Mediterranean Sea. With the results herein showed, *Novafabricia infratorquata* is reported for the first time for the Cantabrian Sea and the north-eastern Atlantic Ocean.

Ecology

Intertidal and shallow waters, along in rocky bottoms, attached to macroalgae assemblages or associated with *Stramonita haemastoma* (Linnaeus, 1767) shells inhabited by hermit crabs. *Novafabricia infratorquata* is known to inhabit acidified zones (Giangrande et al., 2014). In the present study, some Mediterranean specimens were collected up to depths of 49 m.

Genus *Parafabricia* Fitzhugh, 1992

Parafabricia mazzellae Giangrande, Gambi, Micheli & Kroeker, 2014

(Figs 4 & 5)

Parafabricia mazzellae Giangrande et al., 2014: 1422-1423, Fig. 6.

Examined material

Western Mediterranean Sea. L3: MNCN 16.01/16913 (4); L4: MNCN 16.01/16914 (1).

Description of examined material

Complete body with 8 thoracic and 3 abdominal chaetigers (Figs 4A & 5A-B), 0.75-2.30 mm length and 0.30-0.60 width. Body cylindrical, of uniform width along thorax (Figs 4A & 5A-B). Abdomen slightly thinner (Figs 4A & 5A-B). Body uniformly dark brown-coloured in anterior part, pale brown-coloured at posterior end (Fig. 5A-B).

Crown with two branchial lobes with semi-circular bases. Branchial lobes composed of three radioles holding 6-7 pairs of pinnules (Fig. 4A-B). Pinnules terminating at the tip of radioles (Fig. 4A-B). Branchial hearts present. Dorsal lips well-developed and separated from most-proximal pinnule, triangular-shaped, erect and broad, with rounded tips. Ventral filament appendages absent.

Anterior margin of anterior peristomial ring as well-developed ridge dorsally and laterally (Figs 4B-C & 5A, C). Anterior margin of anterior peristomial ring as elongated, broad, flattened and protruding lobe ventrally, tongue-shaped, distally rounded (Figs 4A, C & 5B, D). Anterior peristomial ring equally long dorso-ventrally (Figs 4A-B & 5C-D), two times shorter than posterior peristomial ring, which maintains constant width (Figs 4A-C & 5C-D). Peristomial eyes present, rounded, black, approximately between anterior and posterior peristomial rings (Fig. 4B-C). Vascular loops not observed.

Faecal groove conspicuous (Figs 4B & 5C). First chaetiger at least half as long as following (Figs 4A-C & 5C-D). Thoracic chaetigers increasing in length towards posterior end of thorax (Figs 4A & 5A-B). Abdominal chaetigers decreasing in length towards posterior end of abdomen (Figs 4A & 5A-B).

Superior thoracic notochaetae narrowly hooded, elongated (Figs 4D & 5E), 3-4 per fascicle. Inferior thoracic notochaetae of chaetigers 2 and 8 narrowly hooded, three times shorter than superior ones, 1-2 per fascicle. Inferior thoracic notochaetae of chaetigers 3-7 pseudospatulate, 1 per fascicle (Figs 4D & 5F). Thoracic uncini acicular, hooded, with main fang surmounted by unequal-sized secondary teeth, one of them longer and thicker (Figs 4E & 5G), 8-10 per fascicle in single or

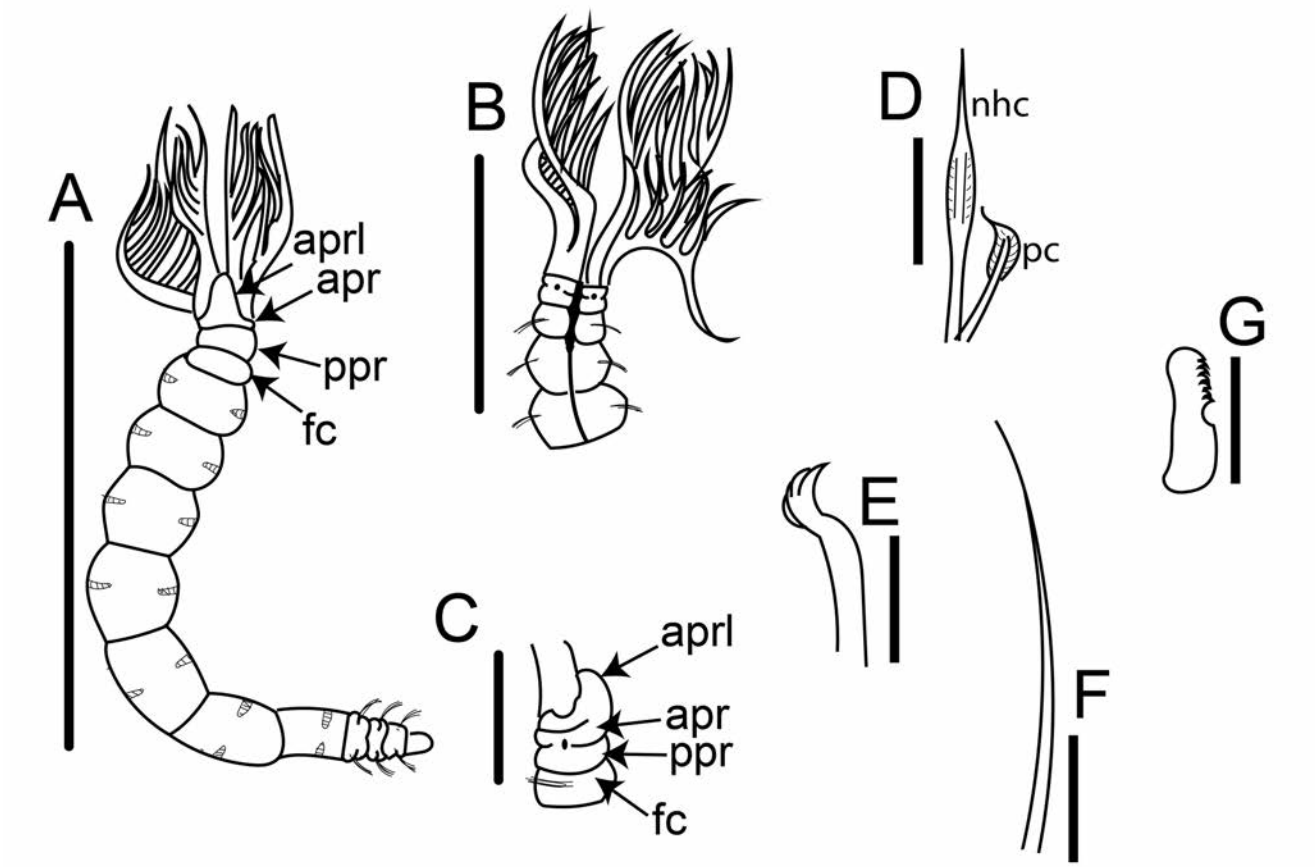

Figure 4. *Parafabricia mazzellae*. **A.** Complete specimen, ventral view. **B.** Anterior body, dorsal view. **C.** Anterior body, lateral view. **D.** Thoracic notochaetae. **E.** Thoracic uncinus. **F.** Abdominal neurochaeta. **G.** Abdominal uncinus. apr: anterior peristomial ring; aprl: anterior peristomial ring lobe; fc: first chaetiger; nhc: narrowly hooded chaetae; pc: pseudospatulate chaetae; ppr: posterior peristomial ring. Scales: A 1 mm, B 0.5 mm, C 0.025 mm, D-G 20 μm. MNCN 16.01/16913.

irregular double rows. Abdominal neurochaetae narrowly hooded, elongated, 2-3 per fascicle (Fig. 4F). Abdominal uncini with a large number of small teeth in dentate region, approximately 7-8 rows in profile, with manubrium up to twice as long as dentate region (Figs 4G & 5H), 8-12 per fascicle.

Pygidium longer than last chaetigers, flattened, quadrangular, distally rounded (Figs 4A & 5A-B). A pair of ellipsoid, black pygidial eyes present. Tube not observed.

Remarks

The studied specimens correspond quite well with those described by Giangrande et al. (2014) from the Tyrrhenian Sea (Mediterranean Sea).The variations in body size and in the number of chaetae and uncini per fascicle, extend the intraspecific variation of the species: the holotype measures 2.1 mm long and 0.2 mm wide, while specimens studied here are from 0.75-2.30 mm long and 0.30-0.60 mm wide. The holotype has 3 narrowly hooded notochaetae and 18-25 abdominal uncini per fascicle, while our specimens have 3-4 narrowly hooded notochaetae and 8-12 abdominal unini per fascicle. In addition, vascular loops in the peristomial ring above the eyes were not observed in the studied specimens, likely due to the dark pigmentation of the anterior part of the body.

Distribution

Western Mediterranean Sea (south-eastern coast of Spain, Columbretes Islands, Tyrrhenian Sea). The specimens herein studied increase the distribution of the species to the Columbretes Archipelago and the eastern coast of Spain. Also, this is the first time that *Parafabricia mazzellae* is reported from out of the type locality.

Ecology

Shallow waters, in rocky substrates. *Parafabricia mazzellae* was first found inhabiting acidified zones (Giangrande et al., 2014). In the present study, specimens

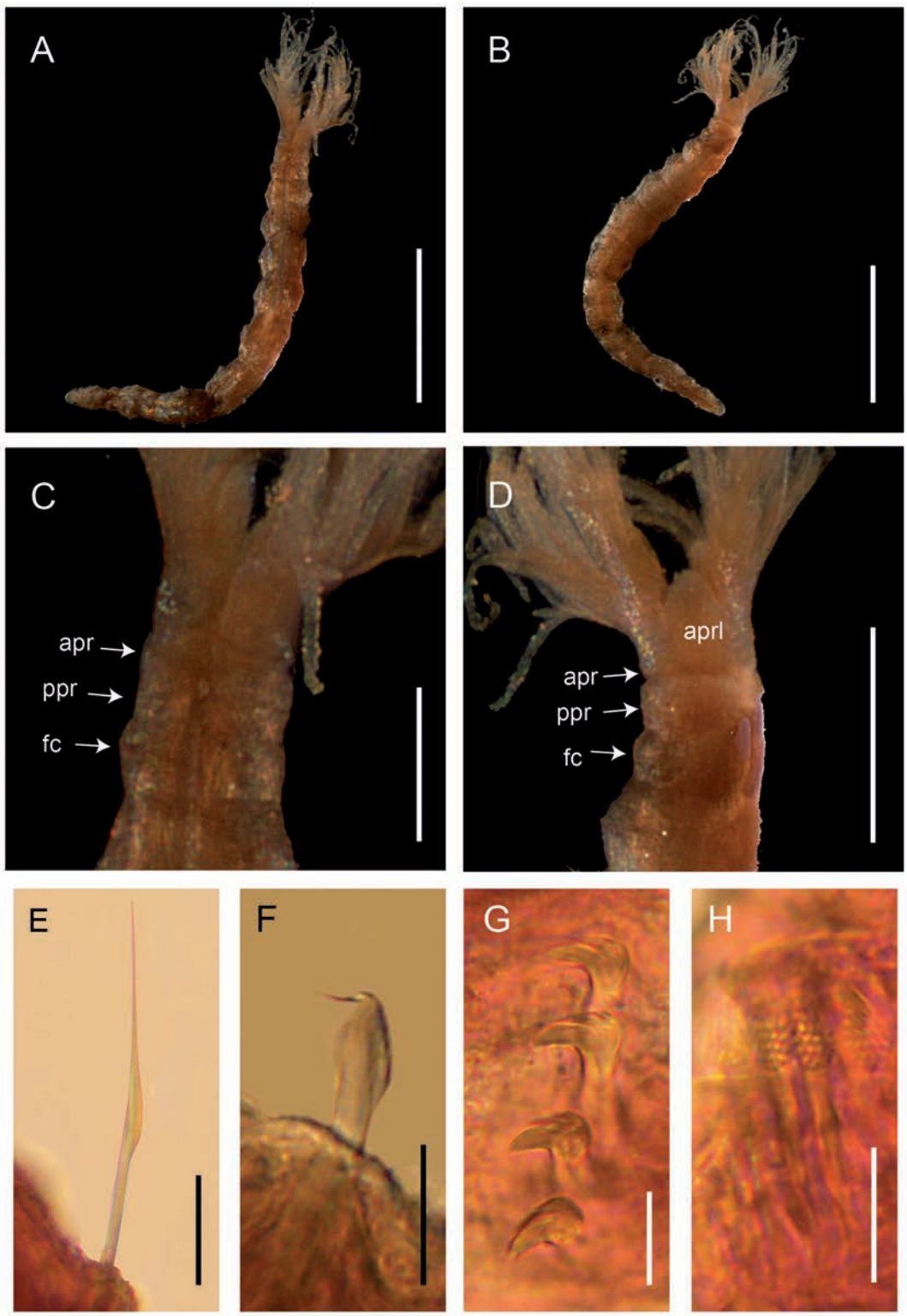

Figure 5. *Parafabricia mazzellae*. **A.** Complete specimen, dorsal view. **B.** Complete specimen, ventral view. **C.** Anterior body, dorsal view. **D.** Anterior body, ventral view. **E.** Thoracic narrowly hooded notochaeta. **F.** Thoracic pseudospatulate notochaeta. **G.** Thoracic uncini. **H.** Abdominal uncini. apr: anterior peristomial ring; aprl: anterior peristomial ring lobe; fc: first chaetiger; ppr: posterior peristomial ring. Scales: A-B 500 µm, C-D 200 µm, E-H 10 µm. MNCN 16.01/16913.

from Columbretes Islands were found at depths up to 47 m and those from Cape Palos were found inhabiting rhizomes of *Posidonia oceanica* (Linnaeus) Delile, 1813.

Genus *Pseudofabricia* Cantone, 1972
Pseudofabricia aberrans Cantone, 1972
(Figs 6 & 7)

Pseudofabricia aberrans Cantone 1972: 108-110, Figs. 1-3; Giangrande & Cantone 1990: 363-364, Figs. 1-3; Cantone et al., 1991: 117; Fitzhugh, 1995: 2-6, Figs. 2-4; Fraschetti et al., 2002: 952; Çinar, 2005: 152; Giangrande et al., 2015: 11.

Examined material

Western Mediterranean Sea. L5: MNCN 16.01/16917 (4). L6: MNCN 16.01/16915 (1). L7: MNCN 16.01/16916 (3).

Description of examined material

Complete body with 8 thoracic and 3 abdominal chaetigers (Figs 6A & 7A-B), 1.0-2.0 mm length and 0.35-0.50 mm width. Body cylindrical, of uniform width along thorax, tapering towards the end of the abdomen (Figs 6A & 7A-B). Body dark brown-coloured in anterior part (Fig. 7A-C). Body uniformly dark brown-coloured in anterior part, pale brown-coloured at posterior end.

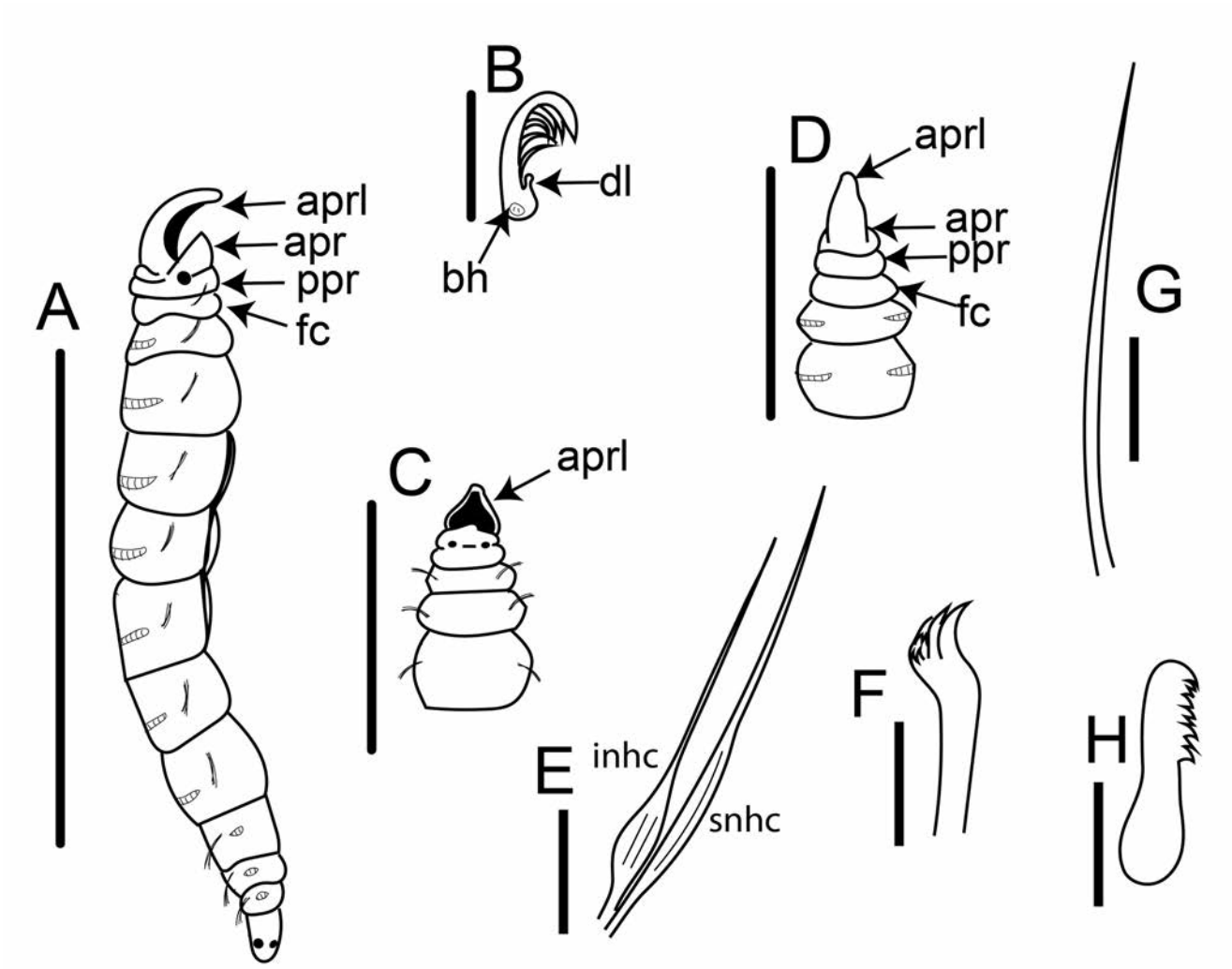

Figure 6. *Pseudofabricia aberrans*. **A.** Complete specimen, lateral view. **B.** Base of branchial lobe and radiole. **C.** Anterior body, dorsal view. **D.** Anterior body, ventral view. **E.** Thoracic notochaetae. **F.** Thoracic uncinus. **G.** Abdominal neurochaeta. **H.** Abdominal uncinus. apr: anterior peristomial ring; aprl: anterior peristomial ring lobe; bh: branchial heart; dl: dorsal lip; fc: first chaetiger; inhc: inferior narrowly hooded chaetae; ppr: posterior peristomial ring; snhc: superior narrowly hooded chaetae. Scales: A 1 mm, B 0.025 mm, C-D 0.5 mm, E-H 20 µm. A and C-H: MNCN 16.01/16916; B: MNCN 16.01/16917.

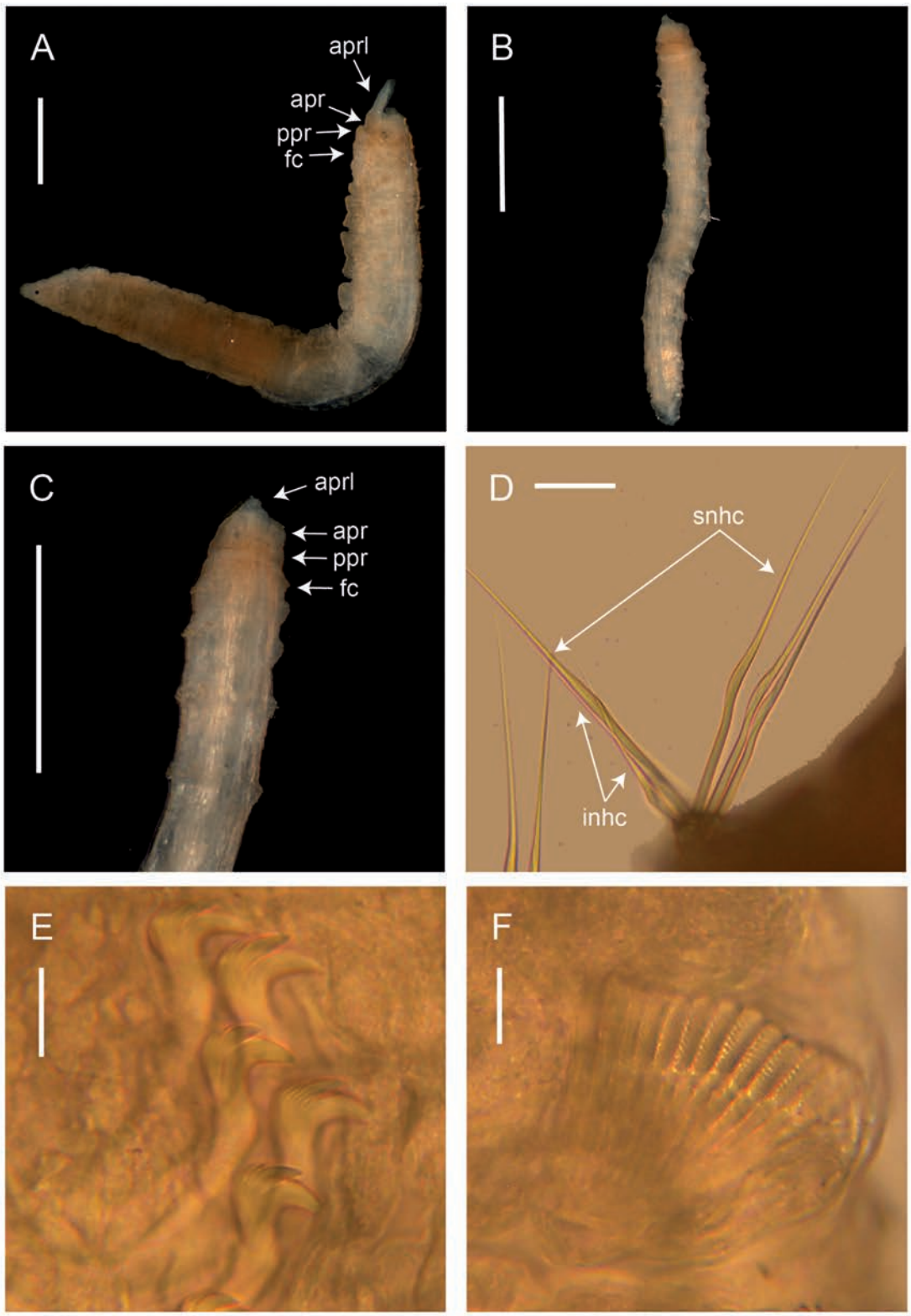

Figure 7. *Pseudofabricia aberrans*. **A.** Complete specimen, lateral view. **B.** Complete specimen, ventral view. **C.** Anterior body, dorsal view. **D.** Thoracic notochaetae. **E.** Thoracic uncini. **F.** Abdominal uncini. apr: anterior peristomial ring, aprl: anterior peristomial ring lobe, inhc: inferior narrowly hooded chaetae, fc: first chaetiger, ppr: posterior peristomial ring, snhc: superior narrowly hooded chaetae. Scales: A 200 µm, B-C 500 µm, D 30 µm, E-F 10 µm. MNCN 16.01/16916.

Crown preserved in some specimens but detached, with two branchial lobes with semi-circular bases. Branchial lobes composed of three radioles holding 6-7 pairs of pinnules (Fig. 6B). Pinnules terminating at the tip of radioles (Fig. 6B). Branchial hearts present (Fig. 6B). Dorsal lips well-developed and separate from most-proximal pinnule, erect, triangular-shaped (Fig. 6B). Ventral filament appendages absent.

Anterior margin of anterior peristomial ring as well-developed ridge dorsally (Figs 6C & 7C). Anterior margin of anterior peristomial ring lower laterally (Figs 6A & 7A). Anterior margin of anterior peristomial ring elongated, broad, flattened and protruding tongue-shaped lobe ventrally, distally rounded (Figs 6D & 7A-B). Anterior peristomial ring half as long as posterior peristomial ring, which maintains constant width (Figs 6A, C-D & 7A-C). Peristomial eyes present in the anterior peristomial ring, ellipsoidal, big and black (Figs 6A, C & 7A).

Faecal groove inconspicuous. First chaetiger approximately as long as both anterior and posterior peristomial rings together (Figs 6A, C-D & 7A-C). Thoracic chaetigers increasing in length towards posterior end of thorax (Figs 6A & 7A-B). Abdominal chaetigers decreasing in length towards posterior end of the abdomen (Figs 6A & 7A-B).

Superior thoracic notochaetae narrowly hooded, very elongated (Figs 6E & 7D), 4-5 per fascicle. Inferior thoracic notochaetae narrowly hooded, usually shorter than superior ones, 1-2 per fascicle (Figs 6E & 7D). Pseudospatulate chaetae absent. Thoracic uncini acicular, hooded, with main fang surmounted by unequal-sized secondary teeth, one of them longer and thicker (Figs 6F & 7E), 6-7 per fascicle in single or irregular double rows. Abdominal neurochaetae narrowly hooded, very elongated (Fig. 6G). Abdominal uncini with a large number of small teeth in dentate region, approximately 10-11 rows in profile, with manubrium up to twice as long as than dentate region, 13-15 per fascicle (Figs 6H & 7F).

Pygidium as long as first or second abdominal chaetigers, tapered, distally rounded (Figs 6A & 7A-B). A pair of rounded, black pygidial eyes present (Figs 6A & 7A). Tube not observed.

Remarks

The studied specimens correspond well with those described by Cantone (1972), Giangrande & Cantone (1990) and Fitzhugh (1995). The latter author studied the lectotype, observing the body laterally flattened and contracted; in contrast, the specimens analysed here are cylindrical and uniformly wide. However, as remarked by Fitzhugh (1995), the shape of the lectotype is likely due to lateral compression. The species was originally described as lacking ventral filamentous appendages and having an anterior end with two lobes, one dorsally (Cantone, 1972). However, Fitzhugh (1995) noted that this description was a misinterpretation of the species' morphology.

Distribution

North Atlantic Ocean (British Islands). Western Mediterranean Sea (Balearic Islands, Tyrrhenian Sea and Ionian Sea). Eastern Mediterranean Sea (Adriatic Sea and north Cyprus). *Pseudofabricia aberrans* is recorded for the first time for the Balearic Islands.

Ecology

Intertidal and shallow waters associated with *Posidonia oceanica,* macroalgae assemblages and detritus. Some of the studied specimens were found at depths up to 22 m.

Order Terebellida sensu Rouse & Fauchald, 1997
Family **Polycirridae** Malmgren, 1867
Genus ***Polycirrus*** Grube, 1850

Type species

Polycirrus medusa Grube, 1850. Type considered lost and neotype designated by Glasby & Hutchings (2014).

Diagnosis

Polycirridae with transverse prostomium attached to dorsal surface of upper lip. Buccal tentacles of at least two types, short ones uniformly cylindrical, long ones spatulated. Peristomium forming two lips. Upper lip large, folded into three lobes. Lower lip swollen. Body segments at least biannulated. First segment reduced, second segment distinctly narrower than following. Body wall papillate throughout, papillae distinctly larger and more abundant on ventro-lateral pads of anterior segments. Notopodia beginning from segment 3, bilobed, elongated. Neuropodia beginning posteriorly to notopodia. Notochaetae winged and/or pinnate. Neurochaetae as avicular uncini of types 1 or 2 (based on Fitzhugh et al., 2015 and Nogueira et al., 2015).

Polycirrus asturiensis sp. nov.
(Figs 8-10)

Examined material

Central Cantabrian Sea: beach Las Llanas (Muros de Nalon, Asturias, Spain). Holotype: L1, MNCN 16.01/16125. Paratypes: L1, MNCN 16.01/16151 (1); MNCN 16.01/16634 (1); MNCN 16.01/16635 (1); MNCN 16.01/16641 (1); MNCN 16.01/16642 (1); MNCN 16.01/16938 (1).

Diagnosis

Buccal tentacles of two types, both spatulated at tips and grooved. Transverse prostomium extending lateral and posteriorly covering segment 1 and terminating lateral to lower lip. Upper lip folded into three lobes. Notopodia triangular to slightly rectangular shaped, with short lobes slightly rounded and equal in length. Notochaetigerous segments with broadly hirsute winged chaetae of two distinct lengths and widths, up to segment 12. Type-1 neurochaetae beginning on segment 6.

Description

Body small-sized (Fig. 8A). Holotype complete 1 cm length, with 30 chaetigers, 10 thoracic and 20 abdominal (Fig. 8A). Buccal tentacles of two types: 1) Long, thin, thickened and spatulated at tips, brittle, superficially grooved and 2) Short, broad, spatulated at tips, stout, deeply grooved (Figs 8A-D & 9A).

Transverse prostomium attached to dorsal surface of upper lip (Fig. 8C). Basal part of prostomium thick, crest-shaped, slightly curved, extending laterally along antero-

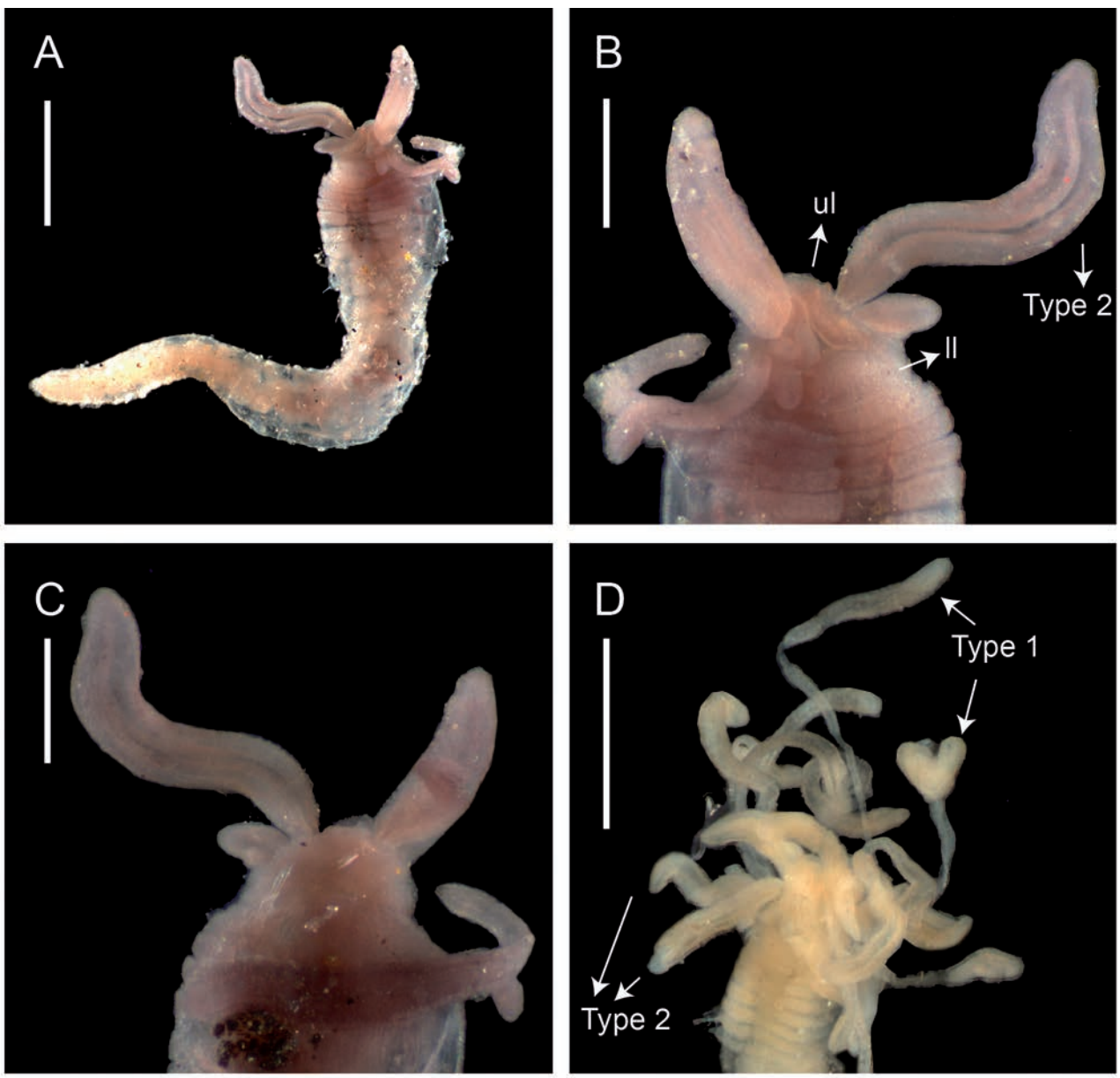

Figure 8. *Polycirrus asturiensis* sp. nov. **A.** Complete specimen, ventral view. **B.** Anterior body, ventral view. **C.** Anterior body, dorsal view. **D.** Anterior body, ventral view. ll: lower lip, Type 1: type 1 tentacles, Type 2: type 2 tentacles, ul: upper lip. Scales: A,D 500 µm; B-C 200 µm. A-C: Holotype, MNCN 16.01/16125; D: Paratype, MNCN 16.01/16641.

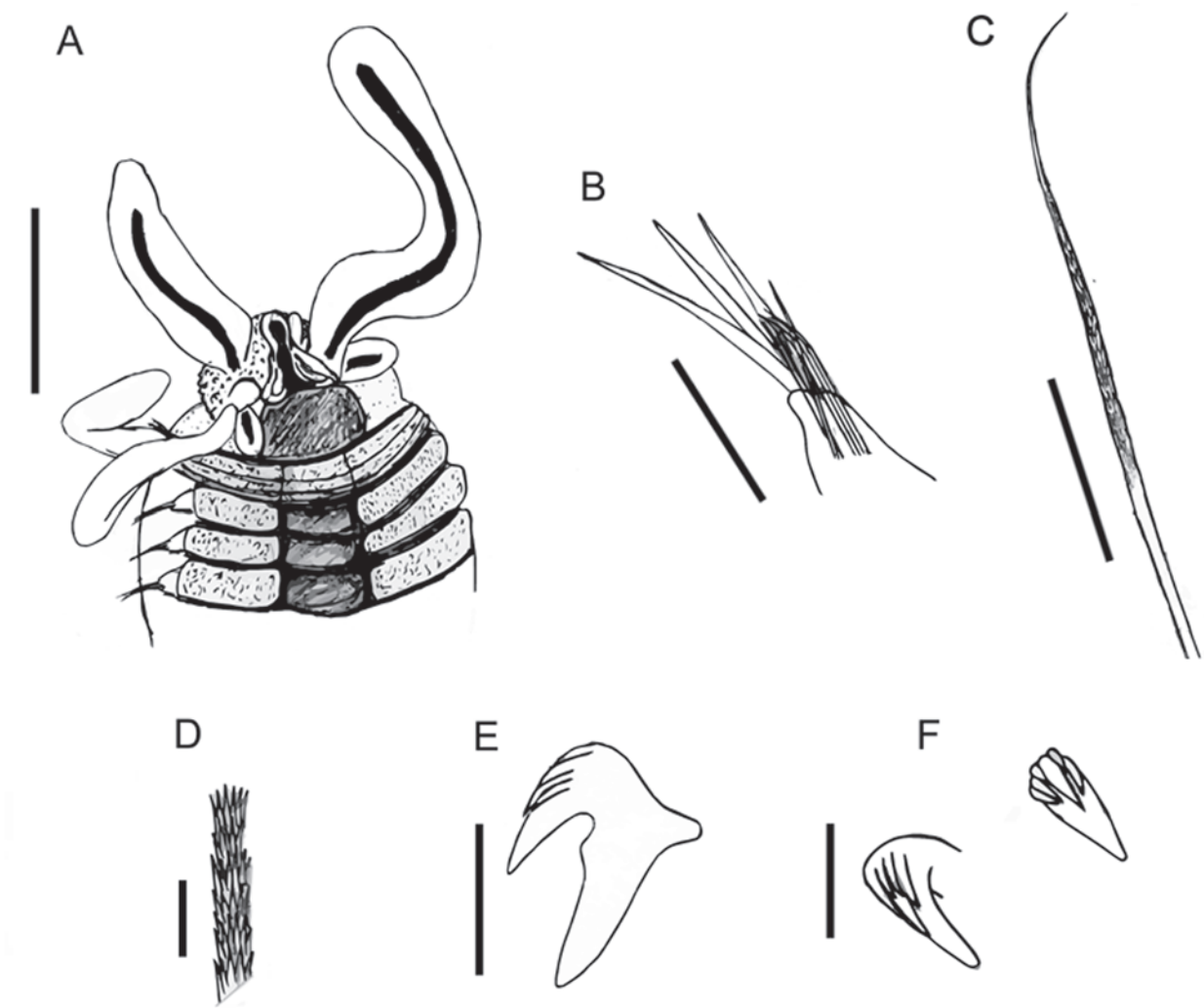

Figure 9. *Polycirrus asturiensis* sp. nov. **A.** Anterior body, ventral view. **B.** Anterior notopodium. **C.** Anterior neurochaetae, lateral view. **D.** Anterior notochaetae. **E.** Detail of the notochaetae microestructure. **F.** Anterior neurochaetae, frontal and fronto-lateral views. Scales: A-B 0.25 mm, C and E-F 5 µm, D 30 µm. A-B: Holotype, MNCN 16.01/16125; C-F: Paratype, MNCN 16.01/16938.

dorsal base of upper lip and covering segment 1 laterally, terminating lateral to lower lip. Distal part of prostomium poorly developed as short lobe of uniform length at base of upper lip.

Peristomium forming two lips (Figs 8A-B & 9A). Upper lip folded into three lobes, glandular and ciliated (Figs 8B & 9A). Lower lip larger than upper lip, cushion-shaped, swollen and uniform (Figs 8B & 9A).

First segment inconspicuous, covered by transverse prostomium dorsally and laterally, and by lower lip ventrally. Second segment reduced but visible, at least half as wide as the following segments (Fig. 8B). Body segments progressively broader and longer until segment 10, then consecutively tapering to uniformly cylindrical to slightly flattened at posterior end of body (Fig. 8A). Anterior abdominal segments larger than posterior ones, with thin body wall and poorly marked segmentation. Posterior abdominal segments slightly more defined and compacted. Ventral body with pairs of papillated, rectangular ventro-lateral pads (Figs 8A-B, D & 9A). Ventro-lateral pads conspicuous from segment 3 to 9, less conspicuous or not visible posteriorly. Mid-ventral groove present from segment 3 (Figs 8A-B & 9A).

Notopodia present from segment 3 to 12, with 10 segments being notochaetigerous. Notopodia distinctly prominent, elongate, rectangular to triangular shaped,

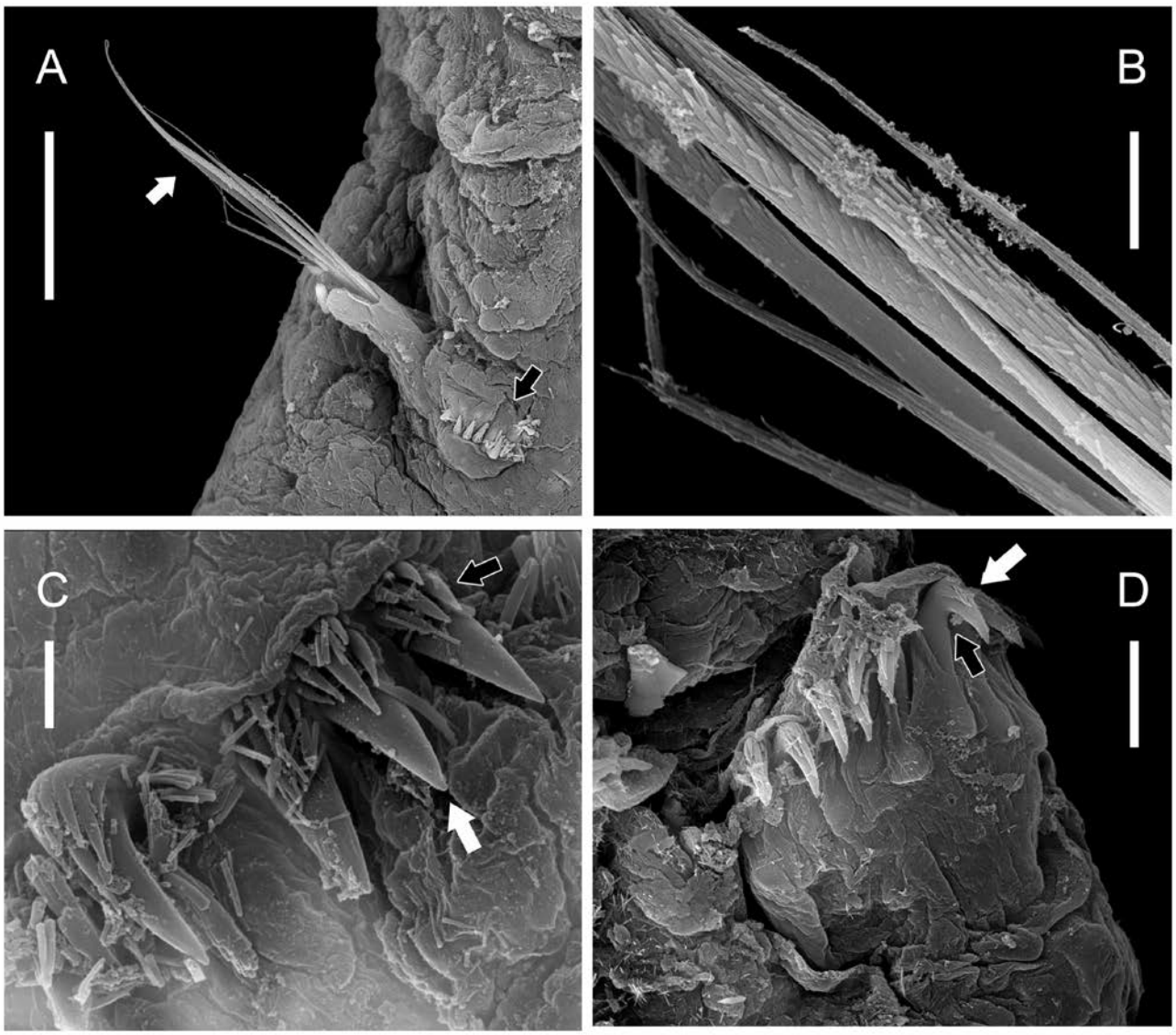

Figure 10. *Polycirrus asturiensis* sp. nov. **A.** Thoracic parapodium showing both notochaeta (white arrow) and neurochaeta (black arrow). **B.** Thoracic notochaetae with different lengths and widths showing the microstructure. **C.** Thoracic neurochaetae showing the main fang (white arrow) and the teeth (black arrow). **D.** Abdominal neurochaetae showing the main fang and teeth (white arrow), and the subrostral process (black arrow). Scales: A 50 μm, B 5 μm, C 2.5 μm, D 10 μm. Paratype, MNCN 16.01/16938.

bilobed (Figs 9B & 10A). Notopodial lobes distally rounded and equally long (Figs 9B & 10A). Broadly winged notochaetae in both rows per side of two distinct lengths and widths, conspicuous by light microscopy (Figs 9C-D & 10A-B). Wings of largest notochaetae start distally (Fig. 10B). Fascicles of 2-10 notochaetae per notopodium.

Neuropodia present from segment 6 to 11. Neuropodia very short, undeveloped at anterior end of body (Fig. 10A) becoming slightly developed and prominent at the posterior end of body (Fig. 10D). Neuropodial uncini from notochaetigerous segments smaller than those from abdominal ones. Uncini of type 1, with short neck, slightly convex base and enlarged median tooth above main fang followed by two rows of smaller teeth that decrease in size (Figs 9E-F & 10C-D). Subrostral process of uncini present as low protuberance (Figs 9E & 10D). Fascicles of 4-11 uncini per torus on abdominal segments.

Pygidium smooth. Nephridial papillae inconspicuous or absent.

Remarks

Polycirrus asturiensis sp. nov. is similar to *Polycirrus denticulatus* Saint-Joseph, 1894 described for the eastern

Atlantic Ocean and recently re-described by Glasby & Hutchings (2014). However, these species can be easily distinguished: the lower lip is quadrangular and cushion-shaped in *P. asturiensis* sp. nov. and ridged, grooved and points toward the mouth in *P. denticulatus*. In *P. asturiensis* sp. nov., the mid-ventral groove is present from segment 3 and ventro-lateral pads are very conspicuous and strongly papillated, at least in segments 3 to 9. In *P. denticulatus*, the mid-ventral groove is present from segment 4, and ventro-lateral pads are inconspicuous and incised. Neuropodial uncini of *P. asturiensis* sp. nov. have a subrostral processes whereas those of *P. denticulatus* lack them. Furthermore, *P. denticulatus* presents conspicuous nephridial papillae, which are absent in *P. asturiensis* sp. nov.

Polycirrus asturiensis sp. nov. is similar to the type species *Polycirrus medusa* Grube, 1850 from the Mediterranean Sea. For the latter, a neotype was designated and described by Glasby & Hutchings (2014). Nevertheless, they can be easily distinguished in various characters. The lower lip in *P. asturiensis* sp. nov. is quadrangular and cushion-shaped, while in *P. medusa* it is sub-triangular, points towards the mouth and extends posteriorly to segment 3. Furthermore, *P. asturiensis* sp. nov. has very conspicuous and strongly papillated ventro-lateral pads, whereas *P. medusa* has inconspicuous ventro-lateral pads. As for body segments, *P. asturiensis* has 10 notochaetigerous segments (up to segment 12) and neurochaetae beginning on anterior segments, while *P. medusa* has 12 notochaetigerous segments (up to segment 14) and neurochaetae beginning immediately after the absence of notopodia on segment 15. Finally, *P. medusa* presents conspicuous nephridial papillae, which are absent in *P. asturiensis* sp. nov.

As in *Polycirrus asturiensis* sp. nov., six other species, *Polycirrus culcita* Nogueira, Hutchings & Carrerette, 2015; *Polycirrus dodeka* Hutchings, 1990; *Polycirrus hesslei* Monro, 1930; *Polycirrus macintoshi* Glasby & Hutchings, 2014; *Polycirrus parvus* Hutchings & Glasby, 1986; and *Polycirrus rubrointestinalis* Nogueira, Hutchings & Carrerette, 2015, share the presence of notopodia with a single type of broadly-winged hirsute notochaetae and type-1 neuropodial uncini (for descriptions see Glasby & Hutchings, 2014 and Nogueira et al., 2015). In *P. rubrointestinalis* from Lizard Island, uncini begin in the anterior part of the body, whereas in the other species, they either begin on the last notopodia-bearing segment (as in *P. dodeka* and *P. hesslei*) or immediately to shortly after termination of notopodia (as in *P. culcita, P. macintoshi* and *P. parvus*).

Polycirrus asturiensis sp. nov. and *Polycirrus rubrointestinalis* can be easily distinguished by several morphological features. The former has a trilobed upper lip and a quadrangular and cushion-shaped lower lip; the latter an entire upper lip and a lower lip divided into two parts: a rectangular inner region restricted to the oral area and a large cushion-shaped, rectangular outer region that extends across the ventrum. In addition, the first segment in *P. asturiensis* sp. nov. is completely covered by the lower lip, and the second segment is reduced, having half the width of the following ones. In *P. rubrointestinalis* the first segment is visible mid-dorsally, and the second segment is not reduced and as wide as the following ones. The ventro-lateral pads of *P. asturiensis* sp. nov. are strongly papillated while those of *P. rubrointestinalis* are smooth or slightly crenulated. Furthermore, notopodia of *P. asturiensis* sp. nov. are elongated, rectangular and bilobed, whereas those of *P. rubrointestinalis* are short, conical and not clearly bilobed. Finally, *P. rubrointestinalis* has conspicuous nephridial papillae, which are absent in *P. asturiensis* sp. nov.

Etymology

The name refers to Asturias, the region where the species was found.

Distribution

Cantabrian Sea (Asturias, Spain).

Ecology

Shallow waters, down to 6 m depth, associated with photophilic and calcareous macroalgae assemblages.

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